LAKE CLASSIFICATION SHORT REPORT EASTON LAKE, ADAMS COUNTY, WI

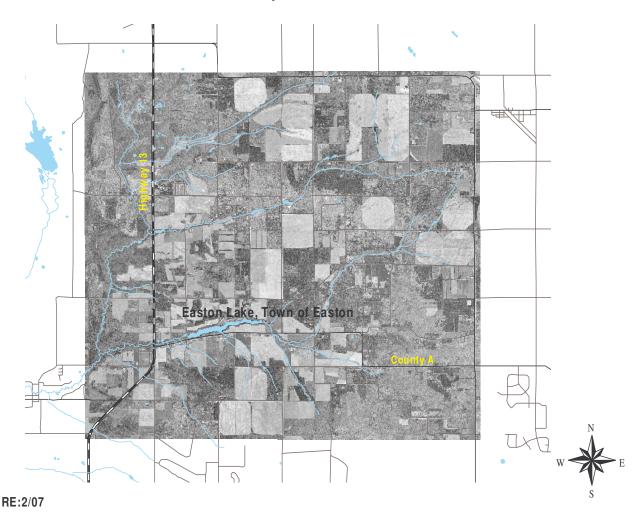
Presented by Reesa Evans, Lake Specialist Adams County Land & Water Conservation Department P.O. Box 287, Friendship, WI 53934

JULY 2007

Introduction

Information about Easton Lake: Easton Lake is located in the Town of Easton, Adams County, WI (T16N, R6E, S28-29), in the south central part of Wisconsin. The impoundment is 24 surface acres in size. Maximum depth is 11', with an average depth of 5'. There is a public boat ramp located on the north side of the lake owned by the Adams County Parks Department. The dam is owned and operated by Adams County.

Easton Lake, Town of Easton



Land Use

Both the surface and ground watersheds of Easton Lake are fairly large, especially when compared to the size of the lake itself. Studies have shown that lakes are products of their watersheds and that land use around a lake has a great impact on the water quality of that lake, especially in the amount and content of runoff from the surface. Residential use is concentrated mostly around the lake itself. Undisturbed natural landscapes tend to have low runoff levels.

| LAND | USE ACRES | & PERCENT | OF. | TOTAL AREA |
|------|-----------|-----------|-----|------------|
| | | | | |

| | Surface | | Ground | | Total | |
|----------------------|---------|---------|---------|---------|---------|---------|
| Easton Lake | Acres | | Acres | | Acres | |
| AgricultureNon | | | | | | |
| Irrigated | 2156.61 | 29.29% | 405.24 | 16.97% | 2561.85 | 26.28% |
| AgricultureIrrigated | 2273.68 | 30.88% | 530.37 | 22.21% | 2804.05 | 28.76% |
| Grassland/Pasture | 39.02 | 0.53% | 10.76 | 0.45% | 49.78 | 0.51% |
| Residential | 1429.89 | 19.42% | 345.07 | 14.45% | 1774.96 | 18.20% |
| Water | 831.28 | 11.29% | 82.86 | 3.47% | 914.14 | 9.37% |
| Woodland | 632.47 | 8.59% | 1013.7 | 42.45% | 1646.17 | 16.88% |
| total | 7362.95 | 100.00% | 2388.75 | 100.00% | 9751.7 | 100.00% |

29.29% of the surface watershed for Easton Lake is in non-irrigated agriculture. Irrigated agriculture accounts for 30.88% of the surface watershed land use. Traditionally, agriculture contributes significantly to the amount of nutrients in water.

Residential land use is the third most common land use category in Easton Lake watersheds, especially around the lake itself, where residential land use is most concentrated. This land use category may also contribute nutrients to the water from stormwater runoff, due manicured lawns and impervious surfaces.

Forested land is the largest land use category in both watersheds, but contributes only 1.3% of the phosphorus to Easton Lake waters. Since forest floors are often full of leaves, needles and other duff, runoff from forested lands is generally more filtered than that from agricultural or residential lands.

The next largest contributor is the ground watershed, covered largely by woodlands (44%) and agriculture (41%). Most of this probably comes from agricultural lands in the ground watershed.

There are also a number of wetlands in the Easton Lake watersheds. Wetlands play an important role in water quality by trapping many pollutants in runoff waters and by serving as buffers to catch and control what would otherwise be uncontrolled water and pollutants. Wetlands also play an essential role in the aquatic food chain, thus affecting fishery, and also serve as spaces for wildlife habitat, wildlife reproduction & nesting, and wildlife food. There are several wetlands at or near Easton Lake's shore, esp. at the northeast end. It is essential to preserve these wetlands for the health of Easton Lake waters.



Example of Wetlands in Wisconsin (not a photo of Easton Lake wetloands)

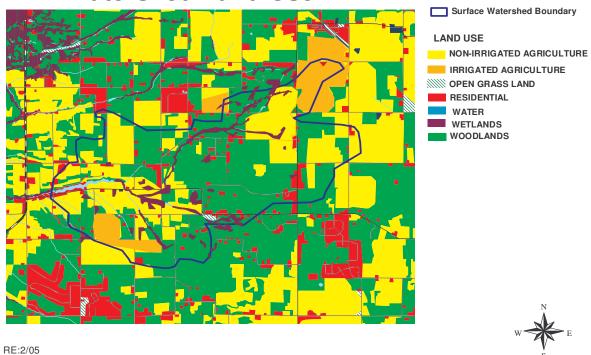
Like many of the lakes in Wisconsin, Easton Lake is a phosphorus-limited impoundment. This means that of the pollutants that end up in the lake, the one that is in the shortest supply and that most affects the overall quality of the lake water is phosphorus. Land use types play a major role in determining the amount of phosphorus being loaded into the lake. Recent statistics and computer modeling suggest that agricultural use (both irrigated and non-irrigated) contributes over 86% of the nutrient pollutants to the lake.

| MOST LIKELY PHOSPHORUS | | | |
|--------------------------|--------|---------|--|
| LOADING BY LAND USE % | | Current | |
| AgricultureNon Irrigated | 28.8% | 1058.2 | |
| AgricultureIrrigated | 38.0% | 1394.8 | |
| Grassland/Pasture | 0.2% | 6.6 | |
| Residential | 3.3% | 118.8 | |
| Woodland | 1.1% | 39.6 | |
| Other Water | 4.0% | 149.6 | |
| Groundwatershed | 24.0% | 880 | |
| Septic | 0.4% | 14.52 | |
| Lake Surface | 0.2% | 6.6 | |
| Total in pounds/year | 100.0% | 3668.72 | |

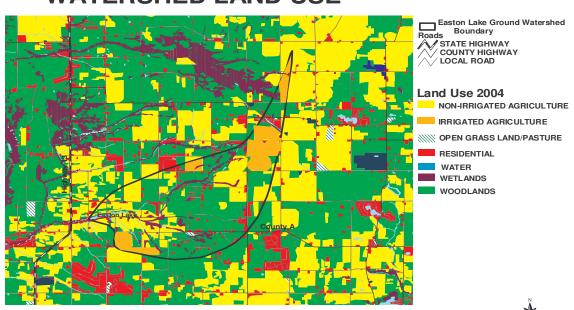
Some aspects of phosphorus loading can't be modified by human behavior changes—they are simply part of the natural landscape. However, phosphorus loading from agriculture (irrigated or non-irrigated), residential and septic use of the land can be changed. Reducing the phosphorus loading from only the land use types directly impacted by human activities by 10% reduces the phosphorus load by over 344.63 pounds/year. While that may not initially sound like a lot, one pound of phosphorus may result in 500 pounds of algae. Just a 10% reduction results in 172,315 pounds less algae per year!

| Land Use | Current | -10% | -25% | -50% |
|--------------------------|---------|---------|---------|---------|
| AgricultureNon Irrigated | 1058.2 | 952.38 | 793.65 | 529.10 |
| AgricultureIrrigated | 1394.8 | 1255.32 | 1046.10 | 697.40 |
| Grassland/Pasture | 6.6 | 6.60 | 6.60 | 6.60 |
| Residential | 118.8 | 106.92 | 89.10 | 59.40 |
| Woodland | 39.6 | 39.60 | 39.60 | 39.60 |
| Other Water | 149.6 | 149.60 | 149.60 | 149.60 |
| Groundwatershed | 880 | 792.00 | 660.00 | 440.00 |
| Septic | 14.52 | 13.07 | 10.89 | 7.26 |
| Lake Surface | 6.6 | 6.60 | 6.60 | 6.60 |
| Total in pounds/year | 3668.72 | 3322.09 | 2802.14 | 1935.56 |

Easton Lake Surface Watershed Land Use



EASTON LAKE GROUND WATERSHED LAND USE

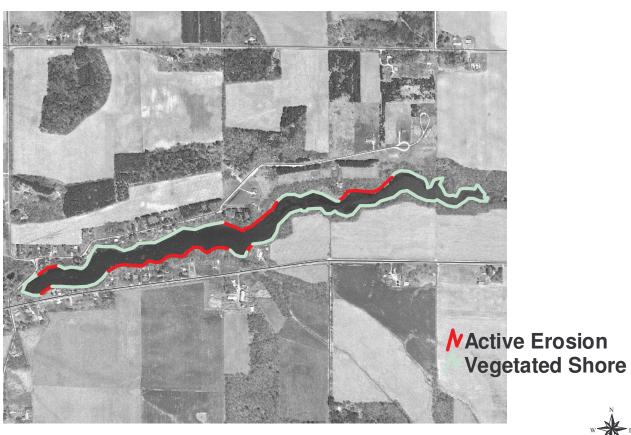


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Shorelands

Easton Lake has a total shoreline of 2.11 miles (11,140.8 feet). Much of the lake shore is in residential use. Most of the areas near the shores are steeply sloped, except at the far northwest end, where the land is flatter. Several buildings along the shore are located very near the water line. Additionally, much of the shore has active erosion that is likely to be negatively impacting the water quality of the lake.

Easton Lake Shoreline Map

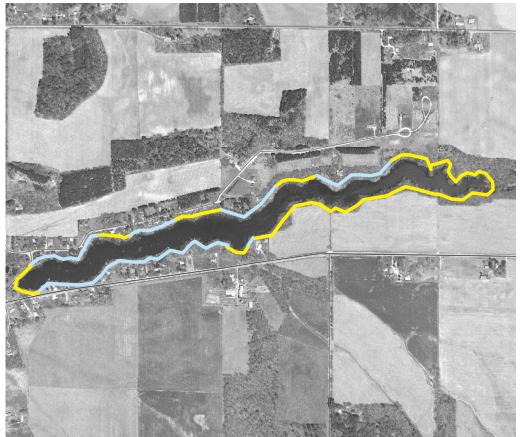


RE:8/05

Native vegetation covers 68% of Easton Lake's shoreline. However; a 2004 shore survey showed that only 46% of the shore had an "adequate buffer." An "adequate buffer" is defined as a native vegetation strip at least 35 feet landward from the shore.

Most of the "inadequate" buffer areas were sections with mowed lawns and insufficient native vegetation at the shoreline to cover 35 feet landward from the water line.

Easton Lake Buffer Map



ADEQUATE BUFFER INADEQUATE BUFFER



RE:8/05

Shoreland buffers are an important protection part of lake restoration. These buffers are a wide border of native plants, grasses, shrubs and trees that filter and trap soil & similar sediments, fertilizer, grass clippings, stormwater runoff other potential pollutants, and keeping them out of the lake. 1990 study by the Wisconsin Department of Natural Resources of Wisconsin shorelines revealed that a buffer of native vegetation traps 5 to 18 times more volume of potential pollutants than does a developed, mowed lawn or hard-armored shore. The filtering process and bank stabilization that buffers provide help improve a lake's water quality, including water clarity.



Example of Adequate Buffer



Example of Inadequate Buffer

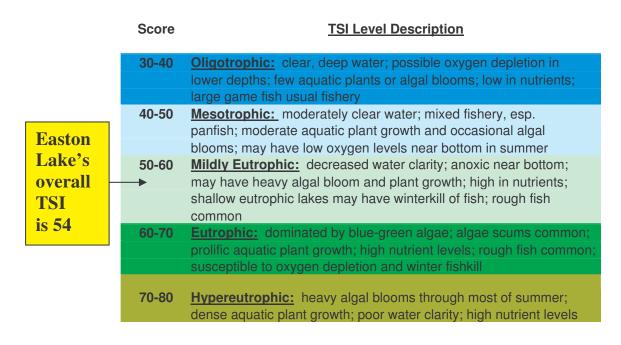
Vegetated shoreland buffers help stabilize shoreline banks, thus reducing bank erosion. The plant roots give structure to the bank and also increase water infiltration and decrease runoff. A vegetated shore is especially important when shores are steep and sandy and/or already eroding, as are many of the Easton Lake shores.

Water Quality Information

One of the measures Wisconsin uses to give a general estimate of a lake's water quality is the **trophic state index.** This index looks at a lake's water clarity, its amount of total phosphorus (the element most related to aquatic plant and algal growth), and its chlorophyll-a level (chlorophyll-a is a pigment used by algae for photosynthesis).

Depending on the trophic index score, lakes are then classified as **Oligotrophic** (good), **Mesotrophic** (fair) or **Eutrophic** (poor),

- Good: Oligotrophic lakes have clear, deep water with few algal blooms. Larger game fish are often found in such lakes.
- Fair: Mesotrophic lakes have more aquatic plant and algae production, with occasional algal blooms and a good fishery. The water is usually not as clear as that of oligotrophic lakes.
- **Poor:** Eutrophic lakes are very productive, with lots of aquatic plants and algae. Algal blooms are often frequent in these lakes. They may have a diverse fishery, but rough fish (such as carp) are also common. Water is often cloudy or murky. Small shallow lakes are more likely to be eutrophic.





Water clarity readings are usually taken by using a Secchi disk (shown at right). Average summer Secchi disk clarity in Easton Lake in 2004-2006 was 7.8 feet. This places Easton Lake's clarity in the "good" category. Water clarity can be reduced by turbidity (suspended materials such as algae and silt) and dissolved organic chemicals that color or cloud the water.

Increased phosphorus levels in a lake will feed algal blooms and also may cause excess plant growth. The 2004-2006 summer average phosphorus concentration in Easton Lake was 42.27 micrograms/liter. This is higher than the recommended 30 micrograms/liter average for impoundments in Wisconsin and puts Easton Lake in the "fair" category for phosphorus levels. This phosphorus level probably contributes to the frequent algal blooms on the lake.





The third measure used in trophic state classification is the amount of chlorophyll-a contained in the lake. The amount of chlorophyll-a found in a lake is an indication about the amount of algae in the lake. The 2004-2006 summer average chlorophyll-a concentration in Easton Lake was 17.2 micrograms/liter. This level of chlorophyll-a gives Easton Lake a "poor" ranking for chlorophyll-a and correlates with the frequent algal blooms seen on Easton Lake. Levels below 10 micrograms/liter are recommended to avoid algal blooms.

In-Lake Habitat

Aquatic Plants

A diverse aquatic plant community plays a vital role in improving water quality, providing valuable habitat resources for fish and wildlife, resisting invasions of non-native species and checking excessive growth of the most tolerant or nuisance species.

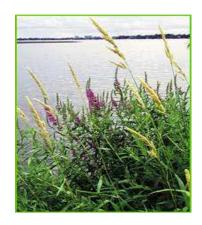
An updated aquatic plant survey was performed in 2006. The 0-1.5ft depth zone supported the most abundant aquatic plant growth, although significant occurrence was also found in the 1.5'-5' and 5'-10' depths. The Easton Lake aquatic plant community is characterized by average quality and average species diversity. Two submergents, *Ceratophyllum* demersum (coontail) and *Elodea canadensis* (waterweed), and two free-floating plants, *Lemna* minor (small duckweed) and *Eastonfia columbiana* (watermeal) were the most common aquatic species. All four of these species, plus six others, occurred at greater than average density of growth.

Important to maintaining such a quality, diverse aquatic plant community is an integrated aquatic plant management plant that controls the invasive plants in the lake. Three invasive exotic were found in Easton Lake: *Myriophyllum spicatum* (Eurasian watermilfoil), *Phalaris* arundinacea (reed canarygrass) and *Potamogeton crispus* (Curly-Leaf Pondweed). None occurred at high frequency and density at this time, but they will need to be monitored.

More detailed information can be found in the aquatic plant report of the 2006 survey, available on request from the WDNR or Adams County Land & Water Conservation Department.



Curly-Leaf Pondweed

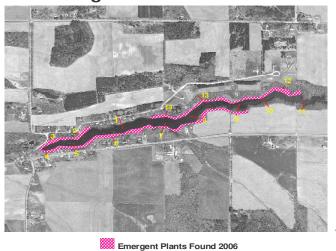


Reed Canary Grass & Purple Loosestrife

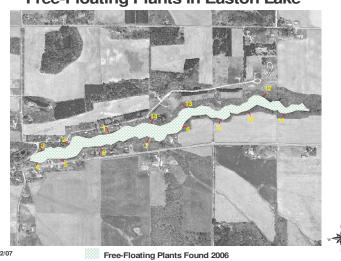


Eurasian Watermilfoil

Emergent Plants in Easton Lake



Free-Floating Plants in Easton Lake



Submergent Plants in Easton Lake



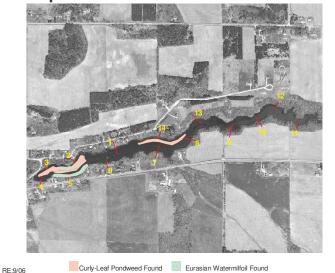
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Submergent Plants Found 2006

Aquatic Exotics on Easton Lake 2006



Fishery/Wildlife/Endangered Resources

A 1954 fishery inventory of Easton Lake found that brown trout, white suckers, golden shiners and bullheads were scarce in the lake, but bluegill and black crappie were abundant or common. A few northern pike were also found. An inventory in the 1960s found the same kind of fish, plus pumpkinseeds and blacknose shiners. Stocking of bullheads was done in the 1930s and 1940s. Reviews found on Lake-Link (online) in 2001 and 2005 described the lake as having "monster bass" and "huge panfish".

Muskrat are also known to use Easton Lake shores for cover, reproduction and feeding. Seen during the field survey were various types of waterfowl and songbirds. Frogs and salamanders are known, using the lake shores for shelter/cover, nesting and feeding. Turtles and snakes also use this area for cover or shelter in this area, as well as nested and fed in this area. Upland wildlife feed and nest here as well.

The Easton Lake watersheds have several endangered natural communities, as well as plants and a lizard of concern. Natural communities found there include Alder Thicket, Calcareous Fen, Dry Prairie, Northern Sedge Meadow, Northern Wet Forest, Shrub-Carr and Stream (hard, fast, cold). The amphibian of concern is the Western Slender Glass Lizard (*Ophisaurus attenuatus*). Special plants found include Bushy Aster (*Aster dumosus*), Early Anemone (*Anemone nemorsa*), Hairy Beardstongue (*Penstemon hirsutus*) and Hooker's Orchid (*Plantanthera hookeri*).

Hooker's Orchid



Bushy Aster



Western Slender Glass Lizard





Early Anemone



Lake Management Plan

- The Easton Lake District needs to make sure, in its review of the lake management plan, to include at least the following aspects concerning the management of the lake: aquatic species management; control/management of invasive species; wildlife and fishery management; nutrient budgeting; shoreland protection; water quality protection.
- The District should take steps to assure that its lake management plan takes into account inputs from both surface and ground watershed residents to address the concerns of the lake community.

Watershed Recommendations

- Inventory surface watershed and ground watershed, documenting runoff from any livestock operations to surface waters; soil erosion sites; agricultural producers not complying with nutrient management plans and/or irrigation management plans.
- Encourage the Adams County Land & Water Conservation Department and landowners to develop and implement plans to address issues identified in inventory.

Water Quality Recommendations

- All lake residents should practice best management on their lake properties, including keeping septic systems maintained in proper condition and pumped every three years, eliminating the use of lawn fertilizers, cleaning up pet wastes and not composting near the water.
- Reducing the amount of impervious surface around the lake and management of stormwater runoff will also help maintain water quality. This is especially important with several buildings very close to the water.
- Residents should become involved in the Citizen Lake Water Monitoring Program, which includes water quality monitoring, invasive species monitoring and Clean Boats, Clean Waters.
- Lake residents should protect and restore natural shoreline around Easton Lake. There is a significant amount of eroding shoreline that needs to be stabilized.
- Wooded undisturbed shores should be left undisturbed and protected, since runoff from these shores is likely to be minimal.

Aquatic Plant Recommendations

- All lake users should protect the aquatic plant community in Easton Lake by assisting in developing and implementing an integrated aquatic plant management plan that uses various methods of control.
- The Easton Lake District should maintain exotic species signs at the boat landings and contact DNR if the signs are missing or damaged.
- The Easton Lake District should monitor for invasive aquatic species and be ready to take steps to manage such should they be discovered to have spread further in the lake.
- Lake residents should get involved in the county-sponsored Citizen Aquatic Invasive Species Monitoring Program. Noting the presence and density of invasives early is the best way to take preventive action to keep them from becoming a bigger problem.
- Since aquatic plant cover in the littoral zone is over the ideal coverage for a balanced fishery (25% to 85%), a plan should be developed to remove plants in some areas of the lake.
- No chemicals, including lawn fertilizers, used oil, pesticides, or similar items, should be used on properties around the lake. If soil test suggests that fertilizers are needed, application needs to be specific for the item to be targeted, rather than broad spectrum, and concentrating on the area only.
- A harvesting schedule should be developed and maintained, with regular harvesting in targeted areas, on a consistent basis.
- The harvesting scheduled should be incorporated into an integrated aquatic plant management plan that includes not only harvesting, but also hand-pulling, chemical spot treatment, and other aquatic plant management options.